Forward Modeling of a Coronal Cavity

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We apply a forward model of emission from a coronal cavity in an effort to determine the temperature and density distribution in the cavity. Coronal cavities are long, low-density structures located over filament neutral lines and are often seen as dark elliptical features at the solar limb in white light, EUV and X-rays. When these structures erupt they form the cavity portions of CMEs

The model consists of a coronal streamer model with a tunnel-like cavity with elliptical cross-section and a Gaussian variation of height along the tunnel length. Temperature and density can be varied as a function of altitude both in the cavity and streamer.
We apply this model to a cavity observed in Aug. 2007 by a wide array of instruments including Hinode/EIS, STEREO/EUVI and SOHO/EIT.

Studies such as these will ultimately help us understand the the original structures which erupt to become CMEs and ICMES, one of the prime Solar Orbiter objectives.